98EC003/73744

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Doyle et al.	Art Unit:	2742
Serial No.:	09/300,676		
Filed:	April 27, 1999		
For:	DYNAMIC SKILL-BASED ROUTING		
Examiner:	Deane, W.		
Attorney Docket No.:	98EC003/73744		

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APPELLANT'S BRIEF UNDER 37 CRF §1.192

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Final rejection of February 2, 2000 and in support of the applicant's Notice of Appeal filed March 29, 2000, the applicant appeals as follows:

I. Real Party in Interest.

The above-named applicant is the real party in interest.

II. Related Appeals and Interference.

None.

III. Status of Claims.

Claims 1-38 have been rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 5,903,641 to Tonisson.

IV. Status of Amendments.

The claims have not been amended since the final Office Action of February 2, 2000.

V. Summary of Invention.

The invention is drawn to a method and apparatus of assigning calls to agents of an automatic call distributor based upon use of a target occupancy matrix. A PC 11 receives work assignments from a supervisor/user (Specification, page 10, lines 11-22) and uses such information to create the target occupancy matrix (Specification, page 11, line 4 to page 16, line 19) which defines a percentage of time each agent will be assigned to a particular work type. Where the user specifies a work type occupancy for an agent, the PC 11 will not change it (Specification, page 12, lines 22-24). As each call arrives, a comparison is made to determine a deviation of each agent from the target occupancy for that work type (Specification, pages 6-7). The call is assigned to the agent with the greatest deviation for that work type (Specification, pages 6-7).

VI. Issues.

Whether a call center which logs agents into and out of call queues to achieve an overall optimal proportion of calls of each work type for each agent anticipates a call center which

individually assigns calls of each work type based upon a relative difference between an actual occupancy for each agent and a target occupancy for each agent.

VII. Grouping of Claims.

It is believed that the rejection of claims 1-38 is based upon the same common error. It is therefore requested that the claims be grouped together for the limited purpose of this appeal.

VIII. Argument.

Claim 1, upon which claims 2-13 rely, is drawn to "A method of assigning agents of an automatic call distributor . . . comprising the steps of . . . assigning the call to an agent of the agents of the automatic call distributor with a largest relative difference between an actual occupancy of calls of the first type handled by the agent and the target occupancy of calls of the first type determined for the agent in the target occupancy matrix". In order for a call to be assigned to an agent with a largest relative difference between an actual occupancy and a target occupancy, a comparison would necessarily have to be performed in the case of each call. It is not believed that Tonisson contains such a teaching. Further, it is believed that Tonisson operates in a fundamentally different manner than the claimed invention.

For example, in Tonisson, "actual $R_{s,a}$" is the "actual proportion of time that each agent spends handling calls for each skill" (Tonisson, col. 10, lines 23-24) and "optimum $R_{s,a}$" is "the optimum proportion of work that each agent spends handling calls" (Tonisson, col. 10, lines 30-32). To assign calls, a "Vector . . . compares the actual $R_{s,a}$ with the optimal $R_{s,a}$ for each agent and each skill and adjusts the agents' call-handling priorities in order to bring the actual $R_{s,a}$ values more in line with the optimal $R_{s,a}$ values (Tonisson, col. 10, lines 33-37). A person of skill in the art would understand the phrase "adjusts the agents' call-handling priorities" to suggest a parametric change to a call handling vector. It would not be understood to mean a direct comparison between an actual occupancy of calls and a target occupancy and assignment of calls based thereon.

Further, the Summary of Tonisson provides a statement which parallels the above statement and clearly supports this view. The Summary states (col. 2, lines 34-43) that "The actual assignments of the plurality of call center [agents] to skills are then automatically adjusted to bring the actual assignments closer to the determined optimal assignments". Because of the parallelism of sentence construction, it is clear that the sentence at col. 2, lines 39-43 is drawn to the same subject matter as the sentence at col. 10, lines 33-37. It is also clear

from the Summary that call assignments are based upon agent assignments to skills queues.

Further, even if one were to assume *arguendo* that the Tonisson optimum $R_{s,a}$ was a target occupancy matrix, which it is not, it is clear that Tonisson functions in an entirely different manner than that of the claimed invention. For example, under Tonisson, the optimum proportion $R_{s,a}$ is achieved by logging an agent into and out of a skill. More specifically, "If the actual work proportion does exceed the optimum work proportion, vector 150 . . . logs the selected agent out of the selected skill" (Tonisson, col. 10, lines 42-46). Alternatively, "if the optimum proportion of work that the selected agent spends handling calls for the selected skill exceeds the actual proportion of work . . . the . . . vector 150 . . . logs the selected agent into the selected skill" (Tonisson, col. 10, lines 49-56).

Logging an agent into and out of a skill queue is different than assigning calls based upon the relative difference between an actual occupancy of calls handled by an agent and a target occupancy of calls in a target occupancy matrix. Moreover, a person of skill in the art would recognize that logging agents into and out of call queues involves procedural and structural elements of a call center that are fundamentally different than those elements used for call assignment. Since Tonisson logs agents into and out of a call queue to achieve a desired

proportion, the rejection is believed to be improper and should be reversed.

In the Advisory Action of April 28, 2000, the Examiner asserts that

> "Applicant's representative argues that Tonisson does not teach assigning calls to an agent based upon a relative difference between an actual occupancy and a target occupancy. The Examiner disagrees. Giving Tonisson the broadest interpretation it is believed that such assigning of calls is taught by Tonisson."

The Examiner's statement reveals a fundamental error which is believed to have resulted in the rejection of this application. As is well-known to patent practitioners, it is the claims of an application which are to be given a broad interpretation. Patents, on the other hand, must be interpreted in light of what would be understood by those of average skill in the art. Since the Examiner has applied the wrong standard, it is believed that this fact alone requires a reversal of the rejection.

For example, "Anticipation cannot be predicated on teachings in a reference that are vague or based on conjecture" Datascope Corp. v. SMEC, Inc., 224 U.S.P.Q. 694, 698 (D.N.J. 1984) *aff'd in part & rev'd in part* 776 F.2d 320, 227 U.S.P.Q. 838 (Fed. Cir. 1985). Since the Examiner has found it necessary to rely upon the "broadest interpretation" of Tonisson, it is believed that the Examiner has inherently admitted that the teachings found by the Examiner are vague or based upon conjecture.

The Examiner asserts in the Advisory Action of 4/20/00 that:

> "It would be clear to one of ordinary skill in the art that a target matrix is taught by Tonisson. It would be clear to one of ordinary skill in the art that Tonisson also teaches an actual matrix, how else could one determine the optimum for a system without comparing a target matrix to that of an actual matrix".

The Examiner's uncertainty over how one could determine the optimum for a system again confirms the lack of any specific teaching within Tonisson regarding a target matrix and an actual matrix. Further, Tonisson actually does provide an explicit teaching of how one determines the optimum for the system without comparing a target matrix to that of an actual matrix. More specifically, "Vector 150 selects a first agent (a), at step 408, and a first skill (s), at step 410, and compares the actual $R_{s,a}$ with the optimum $R_{s,a}$ to determine if the actual proportion of work that the selected agent spends handling calls for the selected skill exceeds the optimum . . . If the actual work proportion does exceed the optimum work proportion, vector 150 . . . logs the selected agent out of the selected skill" (Tonisson, col. 10, lines 37-46). Since Tonisson does not provide any teaching regarding an actual occupancy and target occupancy and does teach logging agents into and out of queues, the Examiner's position is believed to be untenable and should be reversed.

The Examiner asserts in the Advisory Action of April 28, 2000 that:

> "It would also be clear to one of ordinary skill in the art that Tonisson teaches assigning calls based on the relative difference between an actual and target matrices to achieve an optimal system. Note that

> Tonisson states at Col. 5, lines 17-18 ". . . distributing calls to agents in such a way as to bring the percentages closer to the ideal. What percentages? The percentages in the target matrix (the ideal) and bring them closer to that of the actual matrix".

It is believed in this regard that the Examiner's position presumes the existence of actual and target matrices. However, as demonstrated above, Tonisson processes agents one-at-a-time, logging the agents into and out of the skill queues. Processing agents one-at-a-time is different than processing calls one-at-a-time.

More to the point however, is that a person of skill in the art would recognize that logging agents into and out of skill queues would result in an entirely different dynamic in terms of call-center operation. Processing each call individually and identifying an agent with a largest relative difference between an actual matrix and a target matrix would result in the most desirable agent receiving the call from the point of view of the call center supervisor. Logging agents into and out of the skill queues simply results in skill queues being randomly deprived of agents.

The rejection is believed to fail because "a reference alleged to anticipate must contain all the elements of the invention" Studiengesellschaft Kohle GmbH v. Dart Indus., 549 F. Supp. 716, 216 U.S.P.Q. 381 (D. Del. 1982) *aff'd* 726 F. 2d724, 220 U.S.P.Q. 841 (Fed. Cir. 1984) (citing Treatise). Since Tonisson does not teach assigning calls with a largest relative difference

between an actual occupancy and a target occupancy, Tonisson does not teach all the elements of the invention.

Further, "it must be shown that the reference contains all of the elements of the claims apart from irrelevant or merely extraneous variations, and that the elements are arranged in the same way to achieve the same result which is asserted to be an inventive function" Reynolds Metals Co. v. Continental Group, Inc., 210 U.S.P.Q. 911 (N.D. Ill. 1981); AMI Indus., Inc. v. EA Indus., Inc. 204 U.S.P.Q. 568, 586-87 (W.D.N.C. 1979) *aff'd* 644 F.2d 876, 210 U.S.P.Q. (4th Cir. 1981) *cert. denied*, 454 U.S. 952, *reh'g denied*, 454 U.S. 1129 (1981). Not only has the Examiner failed to provide a showing that Tonisson teaches all of the elements of the claims, but the Examiner has also failed to show that Tonisson achieves the same result. For example, the logging of agents into and out of call queues is fundamentally different than assigning calls based upon a relative difference between an actual and target occupancy matrix. Assigning calls based upon a difference between an actual matrix and a target matrix assures that agents are always available to answer calls. In contrast, logging agents into and out of call queues under Tonisson does not ensure that any agent would be available to answer incoming calls. For any of the above reasons, the rejection is believed to be improper and should be reversed.

IX. CONCLUSION

For the foregoing reasons, allowance of claims 1-38, as now presented, is believed to be in order. It is respectfully requested that this Board reverse the decision of the Examiner in all respects.

Respectfully submitted,

WELSH & KATZ, LTD.

By
Jon P. Christensen
Registration No. 34,137

May 30, 2000
WELSH & KATZ, LTD.
120 South Riverside Plaza
22nd Floor
Chicago, Illinois 60606
(312) 655-1500

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Examiner: Deane, W.

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5/30/00 Leonard J Hanz
Date

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APPENDIX OF CLAIMS

1. A method of assigning agents of an automatic call distributor to incoming calls of a plurality of call types handled by the automatic call distributor, such method comprising the steps of:

determining a target occupancy matrix including a target occupancy for each agent of the agents of the automatic call distributor for each call type of the plurality of call types;

processing a call of a first type of the types determined in the target occupancy matrix; and

assigning the call to an agent of the agents of the automatic call distributor with a largest relative difference between an actual occupancy of calls of the first type handled by the agent and the target occupancy of calls of the first type determined for the agent in the target occupancy matrix.

2. The method of assigning agents as in claim 1 further comprising generating the target matrix from permanent, semi-permanent and variable data.

3. The method of assigning agents as in claim 2 wherein the step of generating the target matrix from the permanent data further comprises defining a plurality of work types where each work type characterizes at least some of the incoming call types.

4. The method of assigning agents as in claim 3 wherein the step of generating the target matrix from the permanent data further comprises providing a list of agent skill types required for each work type of the incoming call types.

5. The method of assigning agents as in claim 4 wherein the step of generating the target matrix from the permanent data further comprises providing a minimum agent skill level required by each work type of the incoming call types.

6. The method of assigning agents as in claim 5 wherein the step of generating the target matrix from the semi-permanent data further comprises providing a skill level of each agent with respect to each skill type required by each work type of the incoming call types.

7. The method of assigning agents as in claim 6 wherein the variable data further comprises manually providing a target occupancy level for at least some agents of the target matrix.

8. The method of assigning agents as in claim 2 wherein the step of generating the target matrix further comprising randomly assigning work type occupancies to each agent of the plurality of agents within the target matrix.

9. The method of assigning agents as in claim 8 wherein the step of randomly assigning work type occupancies to each agent of the plurality of agents within the target matrix further comprises iterativly repairing the target matrix.

10. The method of assigning agents as in claim 9 wherein the step of iterativly repairing the target matrix further comprises sequentially selecting an agent and randomly selecting a work type.

11. The method of assigning agents as in claim 10 wherein the step of sequentially selecting an agent and randomly selecting a work type further comprises assigning a fractional occupancy of the agent to the randomly selected work type, thereby generating a new target matrix.

12. The method of assigning agents as in claim 11 wherein the step of sequentially selecting an agent and randomly selecting a work type further comprises calculating a change in an objective function of the new target matrix.

13. The method of assigning agents as in claim 12 wherein the step of calculating a change in an objective function of the new target matrix further comprises adopting the new

target matrix as the repaired matrix when the calculated change is less than zero.

14. Apparatus for assigning agents of an automatic call distributor to incoming calls of a plurality of call types handled by the automatic call distributor, such apparatus comprising:

means for determining a target occupancy matrix including a target occupancy for each agent of the agents of the automatic call distributor for each call type of the plurality of call types;

means for processing a call of a first type of the types determined in the target occupancy matrix; and

means for assigning the call to an agent of the agents of the automatic call distributor with a largest relative difference between an actual occupancy of calls of the first type handled by the agent and the target occupancy of calls of the first type determined for the agent in the target occupancy matrix.

15. The apparatus for assigning agents as in claim 14 further comprising means for generating the target matrix from a plurality of permanent, semi-permanent and variable data.

16. The apparatus for assigning agents as in claim 15 wherein the means for generating the target matrix from the permanent data further comprises means for defining a plurality of work types where each work type characterizes at least some of the incoming call types.

17. The apparatus for assigning agents as in claim 16 wherein the means for generating further comprises means for providing a list of agent skill types required for each work type of the incoming call types.

18. The apparatus for assigning agents as in claim 17 wherein the means for generating further comprises means for providing a minimum agent skill level required by each work type of the incoming call types.

19. The apparatus for assigning agents as in claim 18 wherein the means for generating further comprises means for providing a skill level of each agent with respect to each skill type required by each work type of the incoming call types.

20. The apparatus for assigning agents as in claim 19 wherein the means for generating further comprises means for manually providing a target occupancy level for at least some agents of the target matrix.

21. The method of assigning agents as in claim 15 wherein the means for generating the target matrix further comprising means for randomly assigning work type occupancies to each agent of the plurality of agents within the target matrix.

22. The apparatus for assigning agents as in claim 21 wherein the means for randomly assigning work type occupancies to each agent of the plurality of agents within the target matrix further comprises means for iterativly repairing the target matrix.

23. The apparatus for assigning agents as in claim 22 wherein the means for iterativly repairing the target matrix further comprises means for sequentially selecting an agent and randomly selecting a work type.

24. The apparatus for assigning agents as in claim 23 wherein the means for sequentially selecting an agent and randomly selecting a work type further comprises means for assigning a fractional occupancy of the agent to the randomly selected work type, thereby generating a new target matrix.

25. The apparatus for assigning agents as in claim 24 wherein the means for sequentially selecting an agent and randomly selecting a work type further comprises means for calculating a change in an objective function of the new target matrix.

26. The apparatus for assigning agents as in claim 25 wherein the means for calculating a change in an objective function of the new target matrix further comprises means for adopting the new target matrix as the repaired matrix when the calculated change is less than zero.

27. Apparatus for assigning agents of an automatic call distributor to incoming calls of a plurality of call types handled by the automatic call distributor, such apparatus comprising:

a matrix processor adapted to determine a target occupancy matrix including a target occupancy for each

agent of the agents of the automatic call distributor for each call type of the plurality of call types;

a call processor adapted to process a call of a first type of the types determined in the target occupancy matrix; and

a call distributor adapted to assign the call to an agent of the agents of the automatic call distributor with a largest relative difference between an actual occupancy of calls of the first type handled by the agent and the target occupancy of calls of the first type determined for the agent in the target occupancy matrix.

28. The apparatus for assigning agents as in claim 27 further comprising a plurality of permanent, semi-permanent and variable data.

29. The apparatus for assigning agents as in claim 28 wherein the permanent data further comprises a plurality of work types where each work type characterizes at least some of the incoming call types.

30. The apparatus for assigning agents as in claim 29 wherein the matrix processor further comprises a list of agent skill types required for each work type of the incoming call types.

31. The apparatus for assigning agents as in claim 30 wherein the matrix processor further comprises a minimum agent skill level required by each work type of the incoming call types.

32. The apparatus for assigning agents as in claim 31 wherein the matrix processor further comprises a skill level of each agent with respect to each skill type required by each work type of the incoming call types.

33. The apparatus for assigning agents as in claim 33 wherein the matrix processor further comprises a manually entered target occupancy level for at least some agents of the target matrix.

34. The method of assigning agents as in claim 33 wherein the matrix processor further comprising a selection processor adapted to randomly assign work type occupancies to each agent of the plurality of agents within the target matrix.

35. The apparatus for assigning agents as in claim 34 wherein the selection processor further comprises a repair processor adapted to iterativly repair the target matrix.

36. The apparatus for assigning agents as in claim 35 wherein the repair processor further comprises an objective function processor adapted to calculate a change in an objective function of the new target matrix.

37. The apparatus for assigning agents as in claim 36 wherein the objective function processor further comprises a update processor adapted to adopt the new target matrix as the repaired matrix when the calculated change is less than zero.

38. A method of assigning a plurality of agents to incoming calls by an automatic call distributor, such method comprising the steps of:

determining a target matrix specifying a mix and proportion of call types to be handled by each agent of the plurality of agents;

receiving and assigning calls based upon the mix and proportion of call types specified in the target matrix with agent selection based upon an actual occupancy of the target matrix by the agent and a relative difference between the actual occupancy and the target matrix.